Mark Sams, P.E., S.E.

PND Engineers, Inc. | Principal Engineer

PND ENGINEERS, INC.

2021 ASCE Alaska Section | Juneau Branch

Nomination For:

Outstanding Engineer of the Year Award

AMERICAN SOCIETY OF CIVIL ENGINEERS 1852

Nomination By
PND Engineers Inc. | Juneau Office
9360 Glacier Highway Suite 100 | Juneau, AK 99801

Educational Background
B.S. Civil Engineering,
University of Alaska Fairbanks

Professional Registration
Civil Engineer: Alaska #14051
Structural Engineer: Alaska #126427

Professional Organizations And Community Service

ASCE Member: 2009-Present
ASCE Juneau Branch Officer and President 2009-2011
ACI Alaska Chapter Director 2018-Present
ACI Concrete Field Technician Proctor: 2017-Present
SEAAK Board Member, Southeast Representative: 2018-Present
JDHS Volunteer Science Fair Judge: 2017

Mr. Sams is a principal engineer at PND Engineers, Inc.'s Juneau office with over 12 years of field and office professional civil and structural engineering experience throughout Alaska. Mr. Sams has designed and managed numerous projects ranging in size and complexity in Juneau: no project is too small or too large for Mr. Sams in his community. Mr. Sams has provided engineering assistance as a structural design manager, a contract administrator and construction inspector on numerous projects in Juneau involving structural, civil and marine projects. He has extensive experience designing all facets of building and marine projects including; structural steel, concrete, masonry, aluminum and timber components. Mr. Sams has provided assistance with water, sewer, and stormwater drainage work on civil projects. His design experiences include finite element modeling of complexes 3D structures, reinforced concrete paving and developing MathCAD calculation packages. His project experience includes marine infrastructure, buildings, bridges and heavy civil projects. Mr. Sams appreciates working with clients from both the public and private sector and strives to provide valuable engineering assistance with every project he is involved with.

Engineering Achievements in 2021

Downtown Waterfront Improvements, Juneau, Alaska. Project Management/ Structural Engineer/Construction Administration. During the design phase of the project, Mr. Sams developed the structural design of the dock facility. The dock consists of 35,000 sqft of new dock surface, a 400 foot long retaining wall, and new uplands concrete paving. Site work included installing utilities to support future building. The structural design required extensive modeling to determine reactions from both vertical and lateral loading which included a potential for a truck crane that may be utilized in the future building construction or dock extension to the south. The dock was also designed with the foundation for a future shelter building that was moved a second phase of the construction. Through the course of the design phase Mr. Sams coordinated with a number of disciplines including electrical engineers, architects, and landscape architects to make sure all of the structures could support various dock components such as light poles, soil in planters, and vehicle railing.

To accelerate the construction phase of the project, Mr. Sams worked with CBJ to develop a number of items that could be grouped into an owner supplied procurement contract so that the concrete retaining wall construction could begin shortly after NTP was awarded for the project. The procurement contract included all of the retaining wall reinforcement, structural steel imbeds, and steel pipe piles. Once the construction project was awarded, Mr. Sams served as the single point of contact between the contractor and the owner, over saw contractual issues, and managed a team of inspectors during construction. The construction phase of the project lasted approximately 1.5 years. During construction approximately $1million dollars' worth of work was deleted through change orders to accommodate the potential of a second building structure to be added to the dock. Also, significant redesigns of the drive way entrance were developed to accommodate the DOT driveway permit, and added infrastructure for future electric bus charging. Mr. Sams worked to stay ahead of the contractor to prevent unneeded materials from being fabricated or installed prior to issuing the changes, saving the CBJ from significant costs.

Kensington Mine Projects, Juneau, Alaska. Project Management/Structural Engineer/Construction Administration. Mr. Sams worked on a number of small projects for Coeur Alaska at their Kensington gold mine which included the Mobile Maintenance Shop mezzanine, the new ambulance building foundation, an underground concrete water retaining wall and various small structural modifications to various buildings around the mine site.

USFS Anan Wildlife Observatory Shelter. Project Management/Structural Engineer. Mr. Sams worked with a local contractor Rainforest Contracting, out of Petersburg, Alaska, and the USFS to develop the structural plans for the new mortise-and-tenon style open shelter that will be built on the new observation deck at the bear viewing platform at Anan Creek, near Wrangell, Alaska. The remote aspect of the site and the shallow bedrock provided unique challenges for supporting the new structure. Mr. Sams provided unique connection designs to meet the aesthetics required by the owner but maintained a code-compliant connection that was easily constructable by the contractor. The project also included a new foundation for an existing historic structure that will be relocated as part of the project.

USFS Raven's Roost Cabin Design/Build. Project Management/Structural Engineer. Mr. Sams assisted Rainforest Contracting for the design of a new USFS public use cabin near the Petersburg airport. The elevation of the cabin site required accommodating increased snow loads and part of the roof structure. Mr. Sams was able to develop a roof framing system that would support the higher-than-normal snow load and accommodate the used of transparent roofing panels over part of the structure.

USCG Southeast Alaska Waterfront Inspections. Structural Engineer. Mr. Sams provided structural engineering services to inspect 4 waterfront facilities in Southeast Alaska for the USCG. Inspection services included load ratings of three of the four facilities including locations at Sitka, Juneau and Petersburg. At the Ketchikan facility, Mr. Sams provided structural engineering assistance by evaluating the existing capacity of the marine railway cart to support its safe operation with a new vessel.

Eareckson Air Station Temporary Dock Repair. Shemya, AK. Project Management/Structural Engineering/Coastal Engineering/Cost Estimating. Mr. Sams provided structural design services for repairs on an existing sheet pile dock located at the end of the Aleutian Island Chain. This project had an accelerated schedule to develop repair concepts and provide calculations and drawings for a long-term repair project to address damage to the facility from a winter storm while long-term repairs are funded and designed. The design criteria included a design wave great than 30 feet based on the site's exposure. Cost estimating and project scheduling have created challenges of determining the amount of temporary support materials and permanent materials that would be required for construction; the length of time required to barge materials to the site; the repairs' design lives before intallation of permanent repairs; and the sheer size of the structures required to resist the design forces. These all need to be addressed to properly assess costs.

Engineering Achievements Prior to 2021

Port of Juneau Cruise Ship Berths, Juneau, Alaska. Structural Engineer. Provided structural design, project management and construction inspection services on this $54 million project for two new offshore floating concrete pontoon docks in downtown Juneau. The facility provides 2200 linear feet of berthing space for two panamax cruise ships. Mr. Sams provided structural design services for both the north and south approach docks during the design phase of the project. Design work included steel and timber dock superstructure members with steel pipe pile supports utilizing rock anchors and SPIN FIN™ pile tips where necessary for tension loads. During construction, Mr. Sams managed a staff of 5 inspectors working two shifts a day. Mr. Sams worked with the Owner and the Contractor to resolve contract disputes and assisted the Owner with the contract administration.

Statter Harbor Boat Launch Facility, Juneau, AK. Structural Engineer. Mr. Sams designed multiple structural elements of the launch ramp facility including the timber canopy structure and the sections of cantilevered concrete sidewalks. The timber canopy structure design consisted of concrete footings with steel columns and a timber roof structure. The overall geometry of the roof and the roof structural members were coordinated with the Owner and glulam beam suppliers to provide a visually appealing curved roof structure that maximizes the usable covered space without a gutter or drip line. Mr. Sams designed the curved roof surface using a red cedar decking supported by yellow cedar beams to provide a contrasting appearance to the underside of the roof. Using roof decking also reduced the number of roof beams required, since the decking could span a greater distance than typical plywood construction. The curved roof structure allows the roof to drain and shed snow over a retaining wall, but also allows for an unobstructed view of the harbor and Admiralty Island. Mr. Sams used concealed knife plate connections to connect timber members together for a more aesthetically pleasing timber structure. The structure was designed for the prescribed local building code wind and seismic loads as well as the local snow loading. The cantilevered concrete sidewalk design consisted of concrete slab extended 9' out from the MSE wall below with a concrete counterweight. This design required significant attention to concrete deflections, vibrations, and reinforcement strength. To increase the strength of the concrete section the design used a high strength concrete reinforcement greater than is typically used. This reinforcement also has a natural resistance to corrosion preventing the need to galvanize the high strength bar in the marine environment. The concrete mass was used to dampen the vibration and prevent overturning of the cantilever.

USCG Rescue 21 Tower Foundations, Southeast AK and Kodiak, AK. Structural Engineer/CA&CI. Mr. Sams provided structural foundation designs for (4) remote tower sites. Two of the sites were located in Southeast Alaska and two were located on Kodiak. Foundations designed included foundations for 60' tall truss towers without tension cable supports. The designs consisted of rock anchors to resist uplift forces that could be installed using hand operated drill systems. The foundation systems required reducing mass as much as possible since all of the materials were brought to the site with a helicopter and placed by hand. During Construction at one of the sites, the soil conditions differed from the geotechnical report and required a quick redesign and retooling from 6 foot deep rock anchors to 25 foot deep soil anchors to get the tower installed before winter conditions shut down the construction season.

Wrangell Marine Service Center, Wrangell, AK. Structural Engineer/CA&CI. Mr. Sams provided structural design services to design the reinforced concrete paving that support the operation of the 300-ton travel lift used to service the facility. Finite element modeling was used to develop the slab-on-grade concrete stressed from wheel loads. This project was very difficult in design due to part of the site being constructed over old sawdust fill from the saw mill that was previously located on the site. Mr. Sams conducted research to develop a soil modulus for the sawdust based on numerous USFS studies conducted on road building with timber sawmill waste. During construction Mr. Sams provided CA&CI services and spent two summers in the field conducting daily inspections during the construction phases of the project.

Eldred Rock Lighthouse Concrete Repairs Juneau, AK. Structural Engineer/Condition Assessment. Mr. Sams provided support the Eldred Rock Lighthouse Preservation Society as they continue to restore the historical light house on Eldred Rock. Mr. Sams conducted a site visit to inspect the existing condition of the light house concrete walls and assess the island for a possible new marine landing. Mr. Sams provided a system of repair materials repair concrete damage including cracking, delamination, and interior water damage to inside face of the concrete walls.

CBJ Cruise Ship Terminal Staging Area Phase 1, Juneau, AK. Structural Engineer. Mr. Sams was the design project manager for the fixed pier and uplands development project which included 10,000 sq. ft. fixed pier and a concrete paving design. The fixed pier entailed steel piles, pile caps, timber stringers and decking. The new structure bridges the gap between two sections of the existing Seawalk in downtown Juneau between the Tram building and the Visitor Center. Mr. Sams coordinated and designed portions of the bank of 12 electrical conduits below the new dock

structure that were installed to facilitate a future electrical intertie with the Cruise Ship Berths. Mr. Sams coordinated with all disciplines during the design and construction phase of the project to provide a project on-schedule and under budget.

City and Borough of Juneau Port Customs/ Visitor Center, Juneau, AK. Structural Engineer. Mr. Sams provided support during the design phase of this project with designing the pile foundations for two docks supporting one story buildings. Mr. Sams also supported the design effort by designing the seismic hold-downs for the Visitor Center building. Mr. Sams was involved in the design of the concrete retaining wall supporting part of the dock structure. The concrete retaining wall was also supported on piles to prevent settlement and mitigate any long-term erosion.